

# Revised LCR Overview: Summary of Changes

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# Today's Talk

- Federal Lead and Copper Rule
- Michigan Lead and Copper Rule
- Highlighting the major changes
- Implementation
- Q&A

# Why do we care about lead?

- Lead is a potent irreversible neurotoxin
- Lifelong multigenerational impacts
- Lead has no useful purpose in the body
- Health effects from acute and chronic exposures
- No level of lead in the blood is safe; health effects at blood lead levels below previous thresholds



# Why do we care about copper?

- Small amounts of copper are essential for health
- High exposure can result in a variety of negative health effects
- Copper is found in pipes, fixtures, fittings
  - Many opportunities for exposure

# Health Effects

## Health Effects of Lead

- Biggest concern is young children and infants, who absorb more lead than the average adult
- Health effect in children include:
  - Impaired mental development
  - IQ deficits
  - Shorter attention spans
  - Low birth weight

## Health Effects of Copper

- Stomach and intestinal distress
- Complication of Wilson's Disease
- Chronic exposure can cause liver disease in predisposed individuals

# Sources of Lead in Drinking Water

- Lead pipes
  - Service lines, customer site piping, and building plumbing
- Brass fixtures and valves
  - These items are ubiquitous in water treatment plants, distribution systems, customer site piping, and building plumbing systems
- Galvanized pipe
  - Service lines, customer site piping, and building plumbing
  - Harbors particulate lead; lead in the zinc coating

# Lead Variability in Drinking Water

- Many factors affect lead release
- Particulate vs. Dissolved
  - Particulate lead release is random and mostly unpredictable
  - Dissolved lead release is reasonably well characterized

# Particulate vs. Dissolved Lead

## Particulate Release

- Physical disturbances (hydrant flushing, road work, etc.)
- LSL replacement (full or partial)
- Galvanic corrosion
- Hydraulic disturbances and transport of particles

## Dissolved Release

- Largely dependent on water quality
- Also on surface area of lead (pipe length, diameter);
- Stagnation time of water



# Why do we have the LCR?

- To minimize lead and copper in drinking water
- The LCR is a treatment technique rule
- The action levels are based on the practical feasibility of reducing lead through controlling corrosion (per EPA)
- Used to help determine if the chemistry of the water is causing excessive corrosion
- Lead and copper are indicators

# Federal Lead Regulations & Lead and Copper Rule

1986 – Lead Ban

1988 – Lead Contamination Control Act

1991 – Lead and Copper Rule

2004 – Lead and Copper Minor Revisions

2007 – Lead and Copper Short-term Revisions

2011 – Reduction of Lead in Drinking Water Act (2014)

2020? – Long-term Lead and Copper Rule revisions

# Michigan's Lead and Copper Rule

June 2018 – Michigan's LCR revisions were promulgated

- Increased monitoring for elevated levels
  - Frequency based on level of risk
- Controlling the levels with treatment
- Removal of sources in the system
  - Lead service line removal
  - Partial lead service line replacement ban

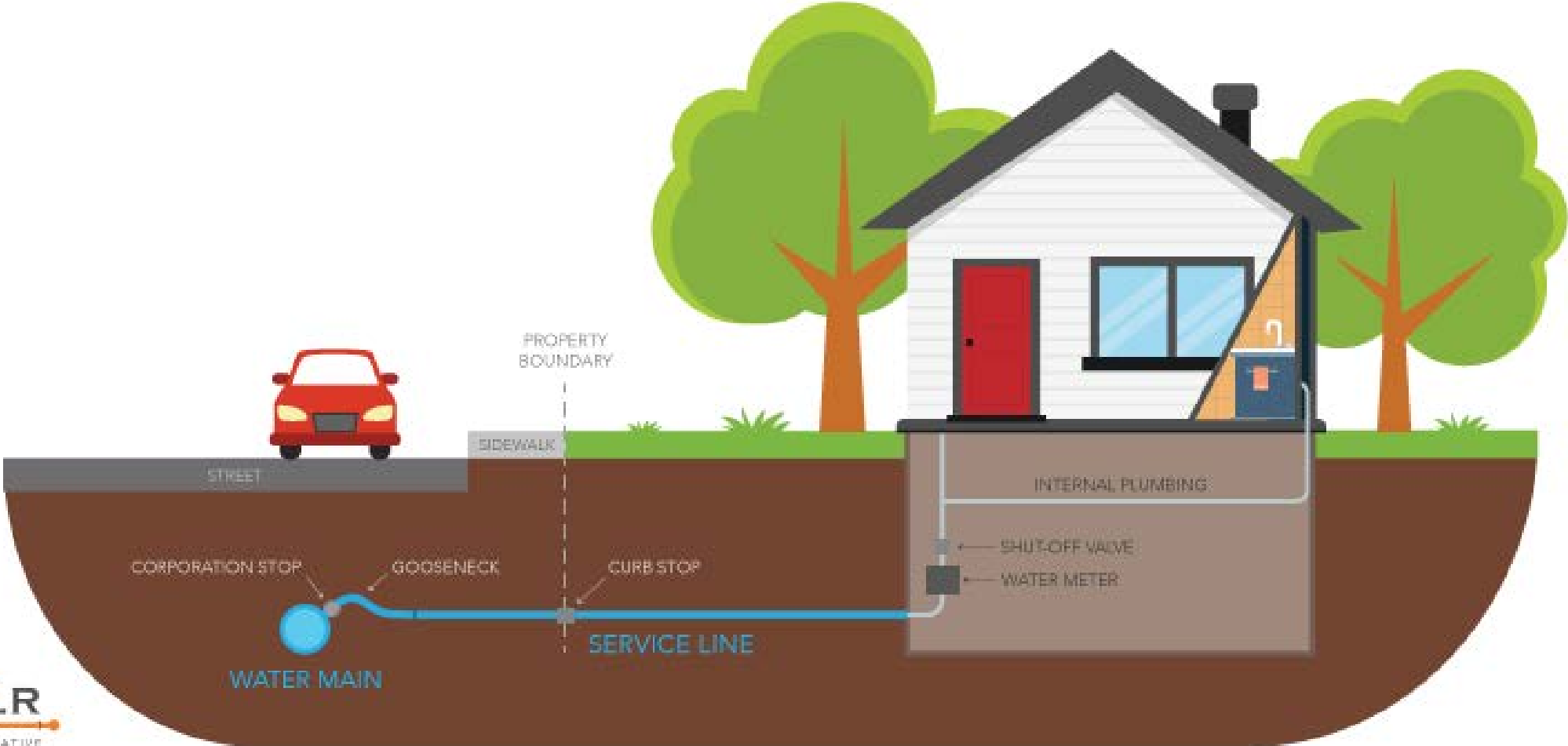
# Major Changes

- Definitions
- Materials Inventory
- Tiering criteria
- Sampling pools
- 90<sup>th</sup> percentile calculation
- Action Level
- Sampling – Tap sampling and WQP
- LSLR
- Transparency
- Public Education
- Water Advisory Councils
- Continuity of Source/Treatment

# Definitions

- **Service Line** – means the pipe from the discharge of the corporation fitting to customer site piping or to the building plumbing at the first shut-off valve inside the building, or 18 inches inside the building, whichever is shorter.
- **Lead Service Line (LSL)** – means either a service line which is made of lead or any lead pigtail, lead gooseneck, or other lead fitting that is connected to the service line, or both.

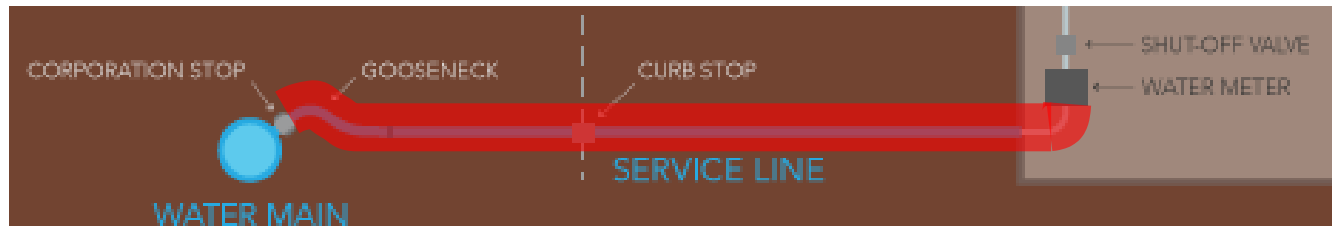
# Service Line Diagrams



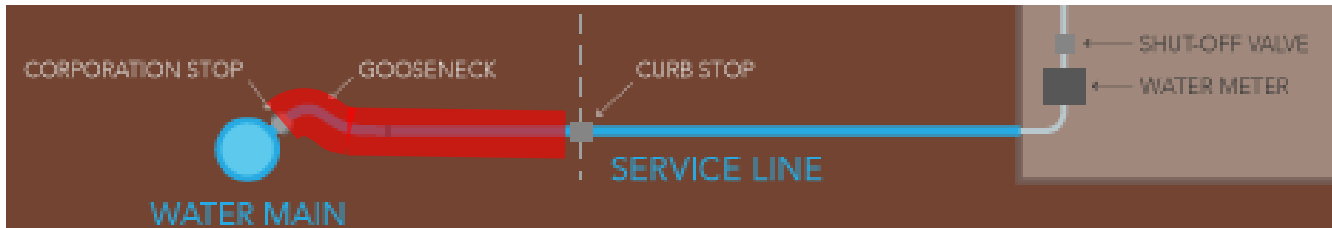
# LSL – Example LSLs

Lead

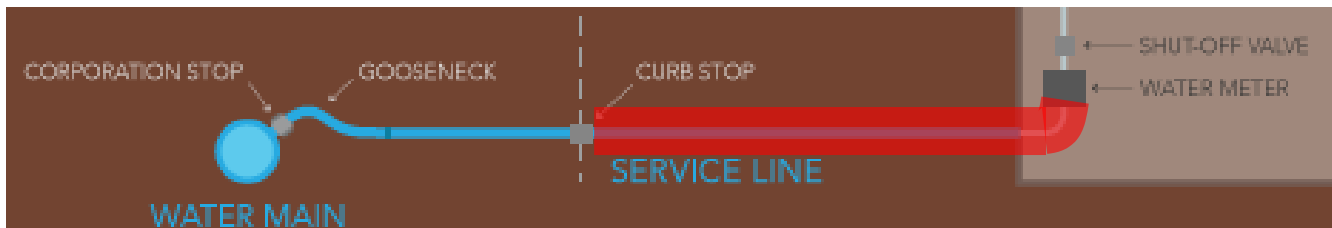
Copper or Plastic



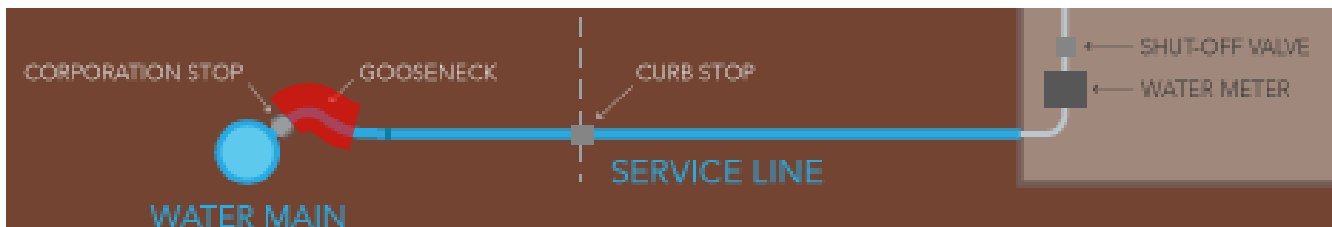
Full LSL



Partial LSL



Partial LSL



Lead gooseneck

# Distribution System Materials Inventory (DSMI)

- All supplies must
  - January 1, 2020 – submit a preliminary DSMI based on available information
  - January 1, 2025 – submit a final comprehensive DSMI. Update inventory every five years
- Supplies with LSLs must
  - Notify residents served by lead service lines within 30 days of determining the service line content
  - Report to the DEQ annually on status of lead service line replacement



# DSMI – Sources of Information

- Plumbing codes;
- Plumbing permits;
- Distribution maps and drawings;
- Inspection and maintenance records;
- Meter installation records;
- Standard operating procedures;
- Operation and maintenance manuals;
- Permit files;
- Existing water quality data;
- Interviews with senior personnel, building inspectors, and retirees; and
- Community survey.

# Tap Sampling – Sampling pool

- Sampling pool
  - Reviewed, updated as necessary, and submitted to DEQ by January 1, 2020
- Preliminary DSMI and sampling pool are BOTH due January 1, 2020
  - Guidance, forms and training to be developed
  - EPA form available on DEQ website

# Tap Sampling - Updating a Sampling Pool

Pool should be routinely evaluated and updated

- Entire lead service line replaced
- Watermain project found lead goosenecks
- Meter replacement found lead service line
- Meter replacement found lead interior plumbing
- Major home remodel

Pool should not be changed

- Resident refuses,  Vacant,  New kitchen sink

# Tap Sampling - Changing Sampling Sites

- Same sampling locations within pool should be used.
  - Acceptable reasons to use an alternate location
    - Homeowner refuses
    - Vacant
    - Change in tier criteria
    - Installation of softener, filter or reverse osmosis device that cannot be bypassed, removed or avoided by using an alternate kitchen or bathroom tap.
- A robust sampling pool should minimize need for “new” sampling locations.

# Tiering Criteria

Site	Sample Category	
Tier 1	A	Single family residence with a lead service line*.
	<del>B</del>	<del>Single family residence with copper plumbing with lead solder installed after 1982 and before 1989.</del>
	C	Single family residence with lead interior plumbing.
	D	Multiple family residence (MFR) with either a lead service line*, <del>copper plumbing with lead solder installed after 1982 and before 1989</del> , or lead plumbing. Note: Only when MFR comprise at least 20 percent of the total service connections for the system.
Tier 2	E	Multi-family residences or other buildings with a lead service line*.
	<del>F</del>	<del>Multi-family residences or other buildings with copper plumbing with lead solder installed after 1982 and before 1989.</del>
	G	Multi-family residences or other buildings with lead interior plumbing.
Tier 3	H	Single family residence with copper plumbing with lead solder installed before 1983.
Other		If no Tier 1, 2, or 3 sites available, sample sites that use plumbing materials commonly found at other locations in the water supply.

\*Priority should be placed on sites with full LSLs, followed by partial LSLs, followed by lead goosenecks.

# Tiering Criteria

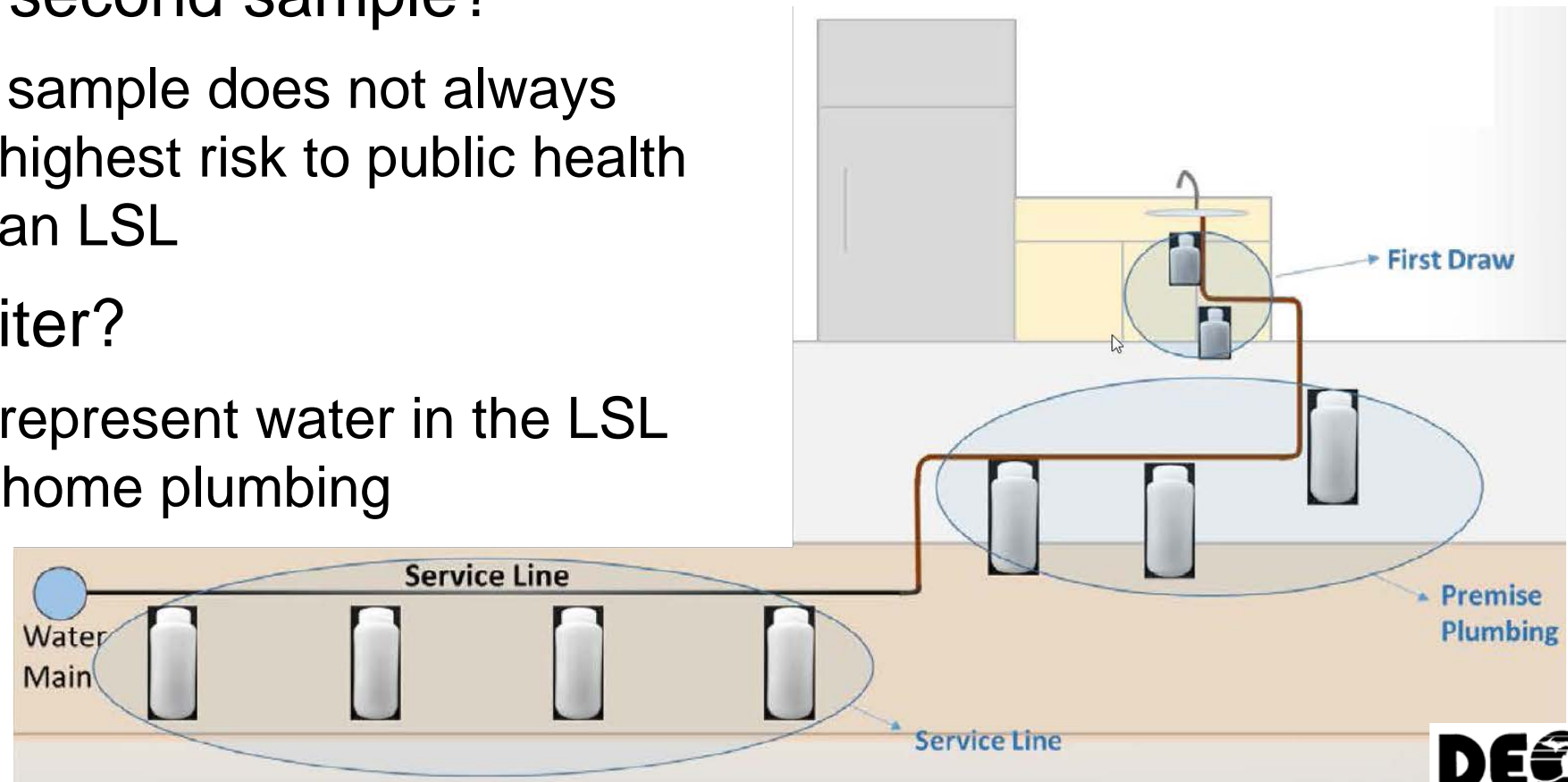
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Tier 2	D	Multi-family residences or other buildings with a lead service line*.
	E	Multi-family residences or other buildings with lead interior plumbing.
Tier 3	F	Single family residence with copper plumbing with lead solder installed <b><u>before July 1988.</u></b>
Other		If no Tier 1, 2, or 3 sites available, sample sites that use plumbing materials commonly found at other locations in the water supply.
*Priority should be placed on sites with full LSLs, followed by partial LSLs, followed by lead goosenecks.		

# Tap Sampling – Sampling Methodology

- Proper sample collection
  - NO systematic flushing of a sampling site
  - NO aerator removal or cleaning immediately before compliance sampling is conducted
- Fifth liter sample at sites with LSLs
  - Sites **without** LSLs continue to collect a first draw sample only
  - Sites **with** LSLs are required to collect a second sample (5<sup>th</sup> liter)

# Tap Sampling – 5<sup>th</sup> Liter Sample

- Why collect a second sample?
  - The first draw sample does not always represent the highest risk to public health for a site with an LSL
- Why the fifth liter?
  - More likely to represent water in the LSL rather than in-home plumbing





# Tap Sampling – Review

## 1<sup>st</sup> liter

- 6hr stagnation
- 1st draw
- 1L volume
- Wide-mouth bottle
- Cold water, kitchen or bathroom tap
- No filter or other device designed to remove inorganics
- Do not remove aerators
- Do not systematically flush

## 5<sup>th</sup> liter

- Collect first liter
- Collect and waste three liters
- Collect 5<sup>th</sup> liter
  - 1L volume
  - Cold water, kitchen or bathroom tap
  - No filter or other device designed to remove inorganics
- DO NOT turn off tap between bottles
- DO NOT let any water run down the drain

# Tap Sampling – 5<sup>th</sup> liter sample



2<sup>nd</sup> through 4<sup>th</sup> liter  
are collected, but are  
not sent to the lab for  
analysis.

Please remember to QA/QC on your samples **BEFORE** you send them to the lab

# 90<sup>th</sup> Percentile Calculation

- Step 1: Place results in ascending order
- Step 2: Assign each a number, 1 for the lowest value
- Step 3: Multiply number of samples by 0.9
  - Example: 20 samples x 0.9 – 18<sup>th</sup> sample
- Step 4: Compare result with action level
  - Example above, 90<sup>th</sup> percentile is value of 18<sup>th</sup> result

\* If number of samples x 0.9 is not a whole number, interpolation is used

# 90<sup>th</sup> Percentile Calculation

90th percentiles are now calculated using the highest lead and highest copper results from each site

- Applies to systems with lead services lines (1<sup>st</sup> and 5<sup>th</sup> liter samples)
- Any other system that collects multiple samples at the same site

	1st Liter		5th Liter	
	Lead (ppm)	Copper (ppm)	Lead (ppm)	Copper (ppm)
123 Main St	0.001	0.6	0	0.04
124 ABC Rd	0.001	0.2	0	0
125 North St	0.002	0.01	0.010	0
126 South Blvd	0.002	0.04	0.002	0.02
127 West Ave	0.002	0.025	0.030	0.01

## 90<sup>th</sup> percentiles

Lead = 0.020 ppm  
Copper = 0.4 ppm

**Lead ALE**

# Action Level (AL)

- AL  $\neq$  MCL (Maximum Contaminant Level)
- An AL is a screening tool for determining when treatment technique actions are needed
- ALs are based on the practical feasibility of reducing lead through controlling corrosion

Lead AL = 0.015 mg/L (15 ppb)

Copper AL = 1.3 mg/L (1300 ppb)

- Maximum Contaminant Level Goals (MCLG)

Lead MCLG = 0 mg/L

Copper MCLG = 1.3 mg/L

# Action Level

- The lead action level of 15 parts per billion (ppb) remains in effect through December 31, 2024
- The new lead action level of 12 ppb takes effect January 1, 2025

# Tap Sampling – Frequency Reduction

- Supplies with optimal corrosion control treatment (OCCT) cannot reduce to three year lead and copper tap monitoring unless...

1) It meets water quality parameter ranges

## AND EITHER

2) The water supply has no lead service lines

2a) The water supply has three annual rounds of sampling with 90th percentiles  $\leq 5$  ppb for lead and  $\leq 650$  ppb for copper.

- No change to supplies without OCCT

# Sampling – Water Quality Parameters (WQP)

- WQP sampling is now required for all supplies with OCCT, including small and medium supplies, and all other supplies exceeding an action level
- Expanded to include chloride and sulfate
- WQP monitoring can reduce to annual if criteria met, but can no longer be reduced to triennial monitoring
- Rules clarified to require establishment of WQP ranges in the distribution system
  - If a supply is outside their WQP ranges for any **nine** days within **six months**, it triggers a Treatment Technique violation.



# Sampling – WQP Sampling Review

## Sampling for systems with corrosion control treatment

- Each point of entry (POE)
  - One sample every two weeks
- # of locations distribution system
  - 6-months from the beginning of the monitoring period
  - Two sets of samples required each monitoring period
    - At least 24 hrs apart; scheduled every quarter on 2019 monitoring schedules
- Distribution system sample locations are representative of the distribution system
  - Similar to bacteriological sampling

# Sampling - Common Errors

## Lead and Copper Tap Sampling

- Site selection – not the highest tier
- Sample collection methodology
  - Not a kitchen or bathroom tap
  - Stagnation time
  - Vacant
- Hold time issues
- Incomplete request for analysis paperwork

## WQP Sampling

- Incorrect WQP analytes
- Failure to collect POE samples every timely (2wks, 6-months, etc)
- Failure to collect second set of WQP samples
- Thermal preservation
- Incomplete request for analysis paperwork

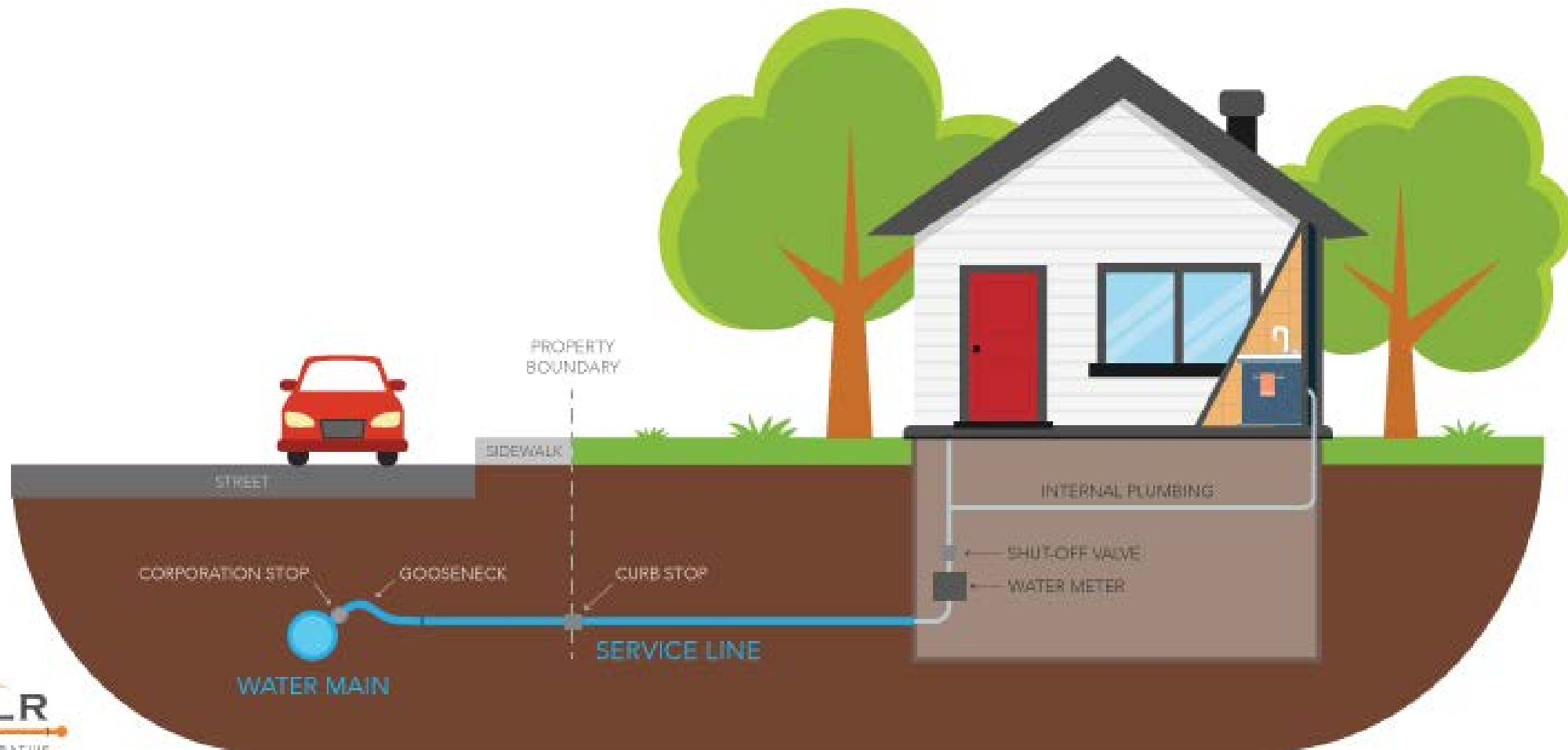
# Lead Service Line Replacement (LSLR)

- A new service line definition was added, and the lead service line definition was updated
- Requirement to replace galvanized that **is or was** connected to a lead service line
- The full lead service line must be replaced at water supply expense, regardless of ownership
- Partial LSLR no longer allowed, except for emergency repair

# LSLR – Replacement Schedules

- Requirement for supplies with a lead ALE and OCCT already in place to conduct LSLR at 7% per year remains in effect
- Additionally, all supplies with LSLs, must conduct LSLR at an average rate of 5% per year, not to exceed 20 years, or in accordance with an alternate schedule incorporated into an asset management plan, and approved by the DEQ

# LSL – Examples

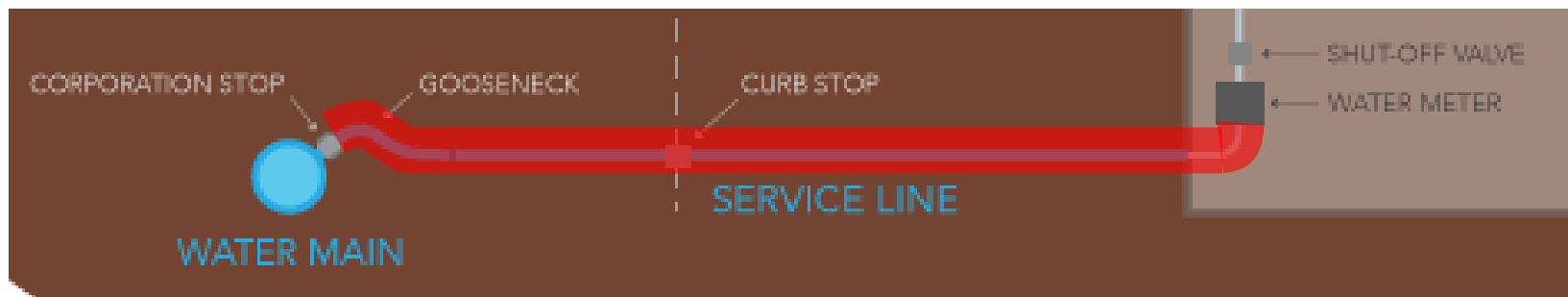


# LSL – Example LSLs

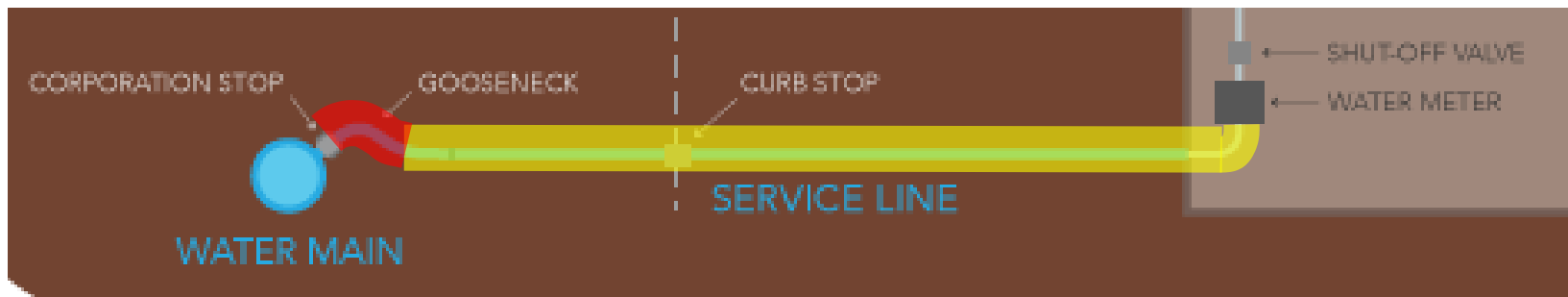
Lead

Galvanized

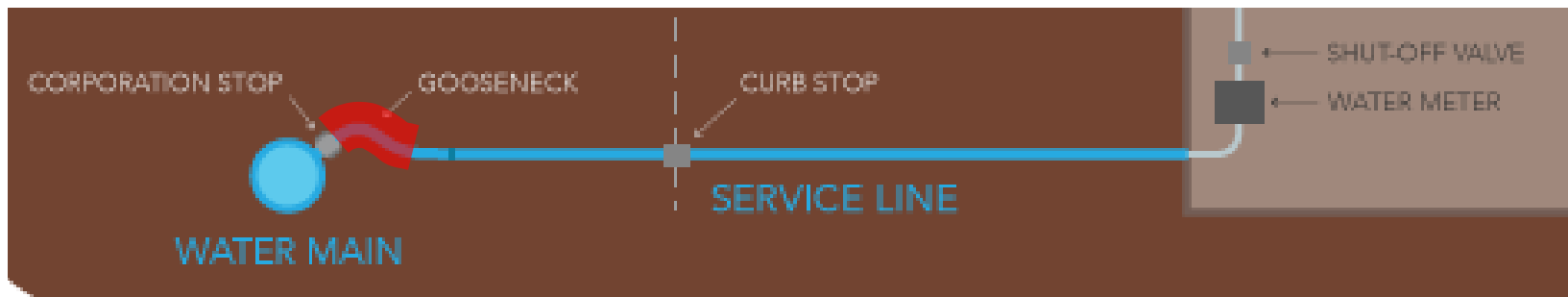
Copper or Plastic



To achieve LSLR requirements, you must replace both public and private portions.



To achieve LSLR requirements, you must replace the lead gooseneck and all galvanized downstream.



To achieve LSLR requirements, you must replace the lead gooseneck.

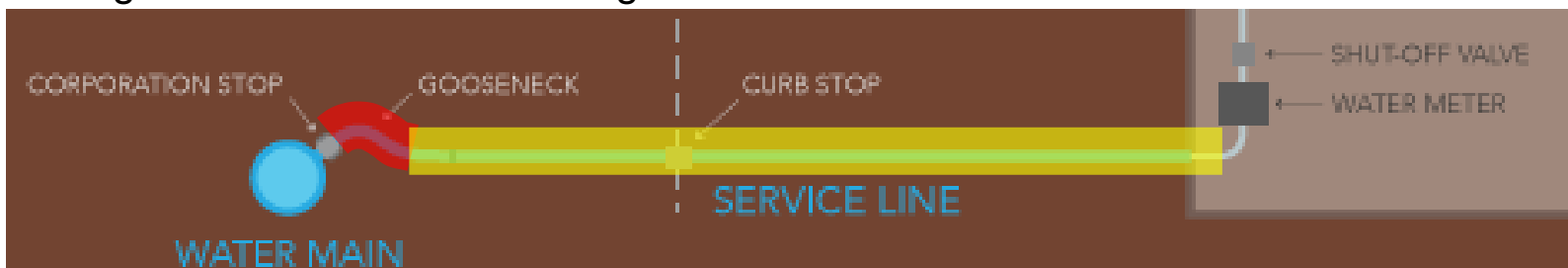
# LSL – Example LSLs

Lead

Galvanized

## Galvanized service lines

Lead gooseneck connected to a galvanized service line.



To achieve LSLR requirements, you must replace the lead gooseneck and all galvanized downstream.

Lead gooseneck has been removed. Galvanized service line remains.



To achieve LSLR requirements, you must replace all galvanized service lines that **is or was** downstream of lead piping.

Galvanized portion must still remain on DSMI and removed as part of 5% LSLR activities.

# LSL Scenarios

Many other service line replacement scenarios exist.

We are currently developing a Frequently Asked Questions document regarding LSLR.



# Partial LSLR Ban

- Partial LSLRs pose a significant health risk
- Construction activities increase exposure to particulate lead
- AWWA standard, C810-17, “Replacement and Flushing of Lead Service Lines”

# LSLR – Emergency Partial Replacement Deadlines

- Notification requirements
  - Timeline: As soon as practicable
  - Content: Explain that they may experience a temporary increase in lead levels; provide guidance on minimizing lead exposure.
- Sampling requirements
  - Timeline: Within **72 hours** after LSLR is completed
  - Method: First and fifth sampling methodology
  - Results: Delivered or mailed to owner/resident within **3 business days**
- Keep remaining partial LSL on your DSMI!

# LSLR Funding - DWRF

- Drinking Water Revolving Fund
  - Can pay for LSLR on public and private property
  - Asset Management efforts
  - Low interest loans with disadvantaged community subsidies
  - Project Plans are due by May 1<sup>st</sup>
  - Extensive application process
- For more information
  - Karol Patton, [pattonk@Michigan.gov](mailto:pattonk@Michigan.gov), 517-284-5415

# Transparency

- Consumer Notice of Results
  - Must now include copper
- Public Education (lead ALE only)
  - Additional content and delivery requirements
- Consumer Confidence Report (CCR)
  - Lead and copper reporting (max and min)
  - Lead service line reporting

# Transparency - Public Education

- Additional content
  - 90<sup>th</sup> percentile
  - Limit of 1-time tests
  - Particulate lead
  - Filter usage
  - “lead-free” standards
- Faster distribution
  - Within 60 days of ALE
- Better distribution
  - Stand-alone publication or referenced on front page
  - Additional vulnerable subpopulations
- Technology
  - Website publication for communities > 1,000
  - Texts and robocalls accepted communication methods

# Transparency - Consumer Confidence Report

- Must include **the most recent** 90<sup>th</sup> percentile
- Number of detects **above the action level** (AL)
- Must include **the range** of individual compliance samples

Inorganic Contaminant Subject to AL	AL	MCLG	Your Water <sup>4</sup>	Year Sampled	# of Samples Above AL	Range of Individual Samples	Typical Source of Contaminant
Lead (ppb)	15	0					Corrosion of household plumbing systems; Erosion of natural deposits
Copper (ppm)	1.3	1.3					Corrosion of household plumbing systems; Erosion of natural deposits

Should be in different units

# Transparency - Consumer Confidence Report

- If CWS has **LSLs** or service lines with **unknown contents**, they need to include:

1. # of LSLs
2. # of service lines of unknown material
3. Total number of service lines

# Lead Advisory Councils

- A statewide advisory council will be created to assist with development of public awareness campaign materials
- Supplies serving 50,000 people or more must establish a community advisory council to assist with development of public awareness campaign materials



# Communication - Review

## **All systems regardless of results**

- Consumer Notice of Lead & Copper Results (CNLC)
  - Individual tap result to persons served at sample site
- Consumer Confidence Report (CCR)
  - Annual report to *all* customers of the 90<sup>th</sup>% result

## **Systems with a Lead Action Level Exceedance**

- Public Advisory
  - Notice to *all* customers of exceedance
- Public Education
  - Informational packet about lead exposure to *all* customers

## **Systems with LSLs**

- Notify customers 45 days before LSLR activities commence
- Notify existing customer or new account holder of a LSL with 30 days of determination
- Notify customer of sample results within 72 hours after a partial LSLR

# Continuity During Source / Treatment Change

- Clarified that supplies purchasing water from a supply with OCCT must also maintain OCCT
- Clarified that DEQ may require new or updated corrosion control studies when a supply changes source or treatment, or at any other time as appropriate

# Implementation

- Partial lead service line replacement ban is in effect
- Many of the Rule changes have future deadlines
- For 2018 monitoring and reporting proceed as previously directed
- New forms and guidance documents are being developed for full implementation in 2019

# Upcoming Dates

September 14, 2018

– Statewide Advisory Councils

December 14, 2018

– Public Water Systems Advisory Councils

January 1, 2020

– Preliminary DSMI

January 1, 2020

– Updated Tap Sampling Pools

January 1, 2021

– 20 year (avg 5%) LSLR Begins

January 1, 2025

– Action Level Lowered to 12 ppb

January 1, 2025

– Verified DSMI

# Materials available online

## [www.michigan.gov/deqlcr](http://www.michigan.gov/deqlcr)

- Strike bold copy of the Rule changes
- Rule making process

## [www.michigan.gov/drinkingwater](http://www.michigan.gov/drinkingwater)

- Link to lead brochures and flyers
  - Reduce exposure
  - Particulate lead
  - Construction activities
- Draft DSMI and Sampling Pool template

## [www.michigan.gov/deqleadcopper](http://www.michigan.gov/deqleadcopper)

- Sampling checklist/instructions
- Report forms
- Link to lead brochures and flyers

## [www.michigan.gov/deqleadpublicadvisory](http://www.michigan.gov/deqleadpublicadvisory)

## [www.michigan.gov/cleanwaterrevolvingfund](http://www.michigan.gov/cleanwaterrevolvingfund)

# Stay tuned for...

Training opportunities

Correspondence

Guidance materials and forms



## Michigan Lead & Copper Rule Workshop for Drinking Water Operators

- March 22 - Lansing - Constitution Hall**
- April 8 - Grand Rapids - GVSU L.V. Eberhard Center**
- April 22 - Rochester - Oakland University**
- April 23 - Bay City - Double Tree by Hilton**
- May 1 - Lansing - Constitution Hall**
- May 14 - Cadillac - Carl T. Johnson Center**
- May 15 - Marquette - Ramada Inn**

The new Lead and Copper Rule was established in 2018 by the State of Michigan to protect public health by minimizing lead and copper levels in drinking water, primarily by reducing water corrosivity. The Michigan Department of Environmental Quality is offering training on the Rule to drinking water operators around the state.

# When You Need Help or Other Resources...

**Jeni Bolt**, Lead and Copper Specialist

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**Karol Patton**, Drinking Water Revolving Fund

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**Questions?**